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TREATING NEUROPATHIC PAIN AND MUSCLE SPASTICITY IN MULTIPLE SCLEROSIS PATIENTS USING CANNABINOIDS: A SERIES OF CASE STUDIES

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Aim: To introduce practitioners to the neurobiology, neurophysiology and clinical issues involved in cannabinoid prescribing with multiple sclerosis patients. Cannabinoids are members of a family of compounds known as terpenoids. As of Sep/06 there are more than 60 cannabinoids that have been scientifically identified and labelled. All of them are ligands, to some extent. The bulk of cannabinoids are from plant source (see fig 1, 2 and 3) - Several synthetic cannabinoids have been formulated. (see figure 4,11,12) Among them are: dronabinol and nabilone. These are both exogenous ligands. These two are available by prescription in North America. Nabilone, the subject of our paper, is believed to bind to the CB1 receptor site, primarily. (see figure 7,8,9)

Another cannabinoid has been synthesized by R. Metchoulam in 1991, known as anandamide. It is a mimic of an endogenous ligand.(see figure 6). Each cannabinoid ligand, binds to one or more receptor sites. The principal cannabinoid receptor sites are: CB1, CB2, CBD and the mu Opioid (see figure 8). The receptor sites are distributed anatomically in the human body as in figure 4 attached.

Collectively, the above constructs constitutes the present-day neurobiological scientific explanation for the mechanism of action of a given cannabinoid ligand.(see figure 9)

Once the ligand has been taken up at the receptor site, the pharmacology and pharmacokinetics for that substance can be predicted, for a statistically average human subject. Clinical consultation is, however, required to determine dosing, route of administration, mode of ingestion, method of monitoring and titrating of each particular cannabinoid drug for a particular clinical patient. An attempt is given, in the case histories presented, to open a practical window for the clinician, of the complexities of cannabinoid prescribing.

Methods: Out of a population of 900 outpatient pain patients, a number of patients who were difficult or impossible to treat with the standard medications, were selected for inclusion in this case series study.

Results: Presented in Tabular form (see Table1). Nine Patients are compared in terms of the following variables:

1. Age and Gender
2. Dose of Cesamet
 - a) at date of study
 - b) mode of ingestion/dosing schedule
 - c) concurrent medications
 - d) methodology of monitoring and titrating cannabinoid medication
3. Start/end and duration of treatment
4. Outcome measures: tests conducted/date
5. Results:
 - a) phenomenological report of patients
 - b) clinicians observations and notes

Conclusion: Although only 9 patients were retained in treatment long enough to be clinically significant to present here, each of these patients is a N=1 self selected longitudinal study. They have each failed the standard therapies, for their condition, after having tried them for varying durations, as an inclusion criterion for this case series. They have each consented to this non-standard therapy, only after having tried the standard therapies. The odds against the degree of success and duration of retention in treatment, occurring by chance, in these patients is **extremely** high. The medico-legal considerations in this category of patient, therefore, give a higher level of statistical significance than the size of the cohort reported on, would seem to indicate. Nonetheless, this study underlines the need for further research and randomized control trials.



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**ARE SERUM MARKERS OF INFLAMMATION RELATED TO STROKE SEVERITY?
THE DEBATE CONTINUES**

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This project was funded by a grant from the Heart & Stroke Foundation of Ontario

Objective: The objectives of this study were to determine whether three serum markers of the acute inflammatory response were a) elevated following stroke and b) related to stroke severity.

Methods: Seventy-one patients with acute onset of stroke recruited between 2000 and 2001 were included. Stroke severity was assessed on day 5 post stroke using the Canadian Neurological Scale (CNS). Serum markers of the acute phase response including C-reactive protein (CRP), Interleukin-6 (IL-6) and Interleukin-1 receptor antagonist (IL-1RA) were collected on days 3 (± 1 day) and 6 (± 1 day) post stroke. Thirty-five healthy, elderly individuals were used to establish a reference standard for normal serum levels of IL-6 and IL-1RA. The upper limit of the normal hospital reference range (7.5 mg/L) was used as a basis for comparison for CRP. All results are reported as mean \pm standard deviation.

Results: Mean age of patients was 69.5 ± 11.6 years. The average CNS score was 6.3 ± 2.7 . The mean values of IL-6 and IL-1RA for control subjects were 2.05 ± 3.0 pg/mL and 622 ± 279 pg/ml, respectively, which were significantly lower compared to stroke patients at both day 3 (IL-6: 25.3 ± 36.9 pg/mL, $p < 0.0001$; IL-1RA: 1097 ± 776 pg/mL) and day 6 (IL-6: 23.8 ± 30.6 pg/mL, $p < 0.001$; IL-1RA: 1283 ± 966 pg/mL, $p < 0.0001$). CRP values were also significantly higher compared to the reference value at both days 3 and 6 (46.6 ± 111.1 mg/L, $p < 0.0001$; 38.2 ± 38.2 mg/L, $p < 0.0001$, respectively). Statistically significant Spearman's rho correlations between CNS scores and serum levels of CRP were evident at both days 3 and 6 (-0.399 , $p = 0.040$, -0.527 , $p < 0.0001$). No associations between IL-6 and IL-1RA and CNS scores were found.

Conclusions: Levels of serum CRP, elevated during the first week following acute stroke, were significantly correlated with stroke severity, measured using the CNS. However, while the cytokines IL-6 and IL-1RA were also significantly elevated following stroke, they were not correlated with stroke severity.



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TIME TO RETHINK THE USE OF SERUM ALBUMIN AS A MARKER OF NUTRITIONAL STATE FOLLOWING STROKE?

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This project was funded by a grant from the Heart & Stroke Foundation of Ontario

Purpose: Although serum albumin is known to be a non-specific marker, its use in nutrition assessment remains widespread. The objective of this study was to determine whether serum albumin, when used either alone or as a component of an objective nutritional assessment tool, could identify correctly patients who were malnourished.

Methods: The nutritional status of 89 hospitalized patients was assessed within 5 days of stroke onset, and again at day 21 using i) serum albumin, ii) an objective method comprised of 6 anthropometric and biochemical measurements, including serum albumin and iii) Subjective Global Assessment (SGA). The results of these assessments were dichotomized: serum albumin $\geq 35\text{g/L}$ = adequately nourished, $<35\text{g/L}$ = malnourished; objective assessment: < 2 indicators below reference standards = adequately nourished, ≥ 2 indicators below standards = malnourished; SGA: A= well nourished, B/C = malnourished. Using SGA as the reference standard, the sensitivity, specificity, positive predictive value and positive likelihood ratios associated with each of the remaining two assessment methods were calculated.

Results: At admission to hospital, no patients were considered malnourished on the basis of SGA. Thirteen patients were considered to be malnourished based on serum albumin, and 19 based on objective methods. By day 21, 9 patients were considered to be malnourished using SGA, 27 patients had an albumin value below 35 g/L and 28 patients were malnourished based on objective assessment. The sensitivity and specificity of assessment for malnutrition using serum albumin were 25% and 64%, respectively. The positive predictive value and likelihood ratio were 8% and 0.69. Using objective assessment measures, the sensitivity and specificity were 50% and 63%, respectively. The positive predictive value and likelihood ratio were 9% and 0.78.

Conclusions: Serum albumin, when used alone or as a component of a more comprehensive nutritional assessment method, was a poor predictor of true nutritional state.



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CONCEALED ALLOCATION: AN UNDER-REPORTED AND MISUNDERSTOOD COMPONENT OF TRIAL METHODOLOGY IN STROKE REHABILITATION.

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This project was supported by a grant from the Canadian Stroke Network

Purpose: Several studies have shown that the rigour of randomized designs is greatly reduced without concealed allocation (CA) to groups. CA is maintained using a variety of techniques to ensure the original randomization schedule is followed with all patients.

Methods: We assessed how CA was reported in a random sample of 50 randomized controlled trials (RCTs) of therapeutic interventions of stroke rehabilitation published after the release of the CONSORT guidelines (1996). The RCTs (25 pharmacological and 25 non-pharmacological) were selected from a database of 313 studies. An operational definition of CA was derived *a priori*, using established criteria.

Results: A mechanism to ensure adequacy of CA was reported in only 14 (28%) of trials. Details of CA were not mentioned in 27 (54%) of trials and ambiguously reported in 5 (20%).

Conclusions: Although concealment of group allocation is an important feature of trial design, it is inadequately reported and often confused with randomization and blinding of outcome assessment.



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RELATIONSHIPS BETWEEN UNMITIGATED COMMUNION AND UNPAID DOMESTIC WORKLOAD AND ADJUSTMENT TO CHRONIC PAIN.

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Purpose: Research suggests that gender differences in the development of and adjustment to chronic pain conditions are largely influenced by psychosocial variables. The present study examined the influence of the gender-role-related variables of unmitigated communion and unpaid domestic workload on adjustment to chronic pain conditions. Unmitigated communion, or the tendency to put the needs and concerns of others ahead of one's own, has been associated with poor adjustment in normal samples, and with poor adherence to medical advice and poor adjustment in medical samples. In addition, women's unpaid domestic workload has been increasingly highlighted in recent theories of the development of chronic upper extremity pain.

Methods: Four-hundred and fifty-five outpatients from Physical Medicine and Rehabilitation, Anaesthesia, and Rheumatology pain clinics completed questionnaires assessing unmitigated communion, unpaid domestic workload, pacing of physical activity, and adjustment.

Results: Results show that unmitigated communion and number of children under the age of 14 (one aspect of unpaid domestic workload) are related to poor emotional adjustment in the context of chronic pain. These variables are also linked to poor pacing of physical activity, something that is central to clinical pain management programs. In addition, these variables also moderate relationships between a variety of risk factors and measures of pain intensity and pain-related disability. Clinical implications of these findings are discussed.

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SUBGROUPS OF PATIENTS AT DIFFERENTIAL RISK FOR DYSFUNCTION SECONDARY TO CHRONIC PAIN: EVIDENCE OF PERSISTING DYSFUNCTION?

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Purpose: A small percentage of patients with persistent pain, those most disabled and distressed, account for an unusually large percentage of costs (medical, disability) associated with pain. Our previous research with outpatients from rehabilitation and anaesthesia clinics identified, on the basis of personality traits, three distinct patient subgroups at risk for dysfunction secondary to pain. These clusters included an “Obsessive-Perfectionistic” Cluster 1, an “Avoidant-Pain-Anxious” Cluster 2, and a “Low-Scoring” (on measures of personality) Cluster 3. Cluster 1 and 2 patients reported greater dysfunction secondary to pain than Cluster 3 patients.

Methods: The present study examined whether patients originally classified as members of greatest-risk subgroups continued to show greatest dysfunction at one-year follow-up. One hundred and twenty-five participants (66% female, mean age=44, mean education=13.5 years, mean duration of pain=6.65 years) from our initial study of coping with pain mailed self-report data on pain, personality, and adjustment one year following initial contact.

Results: Preliminary results suggest that members of Clusters 1 and 2 continued to show poorer adjustment than members of Cluster 3 at one-year followup. While more research is needed, results highlight the need to assess and intervene with pain patients at greatest risk for dysfunction due to pain.

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THE REHABILITATION OF PATIENTS RECOVERING FROM BRAINSTEM STROKES: A NEGLECTED TOPIC

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Purpose: Patients recovering from brainstem lesions account for 10% to 15% of all admissions to stroke rehabilitation units. Unlike the extensive research literature pertaining to the rehabilitation of hemispheric stroke patients, surprisingly little exists on the rehabilitation of brainstem stroke patients, despite the fact that they are well represented in the stroke rehabilitation population. Patients with brainstem stroke experience ataxia, dysarthria and diplopia and dysphagia more frequently than patients recovering from unilateral hemispheric stroke. A significant number of patients also develop paresis. The purpose of this study was to present two case studies that highlight some of the unique challenges associated with the rehabilitation of brainstem stroke and to present a review of some of the associated deficits.

Case Studies: The first case study featured a 35-year old male suffering from a cerebellar/pontine infarct requiring a craniotomy for hemorrhage extension. Clinically significant impairments included severe ataxia, dysarthria, diplopia, hemiparesis and sensory loss. He was able to return to modified work within a year. The second case study was of a 31 year old female with right thalamic/pontine/cerebellar infarcts. Following her initial treatment in an intensive care unit, she also suffered from many of the classic impairments associated with brainstem lesions. At six months post stroke, she was independent in activities of daily living. At one year she was continuing to improve but had not yet returned to work.

Conclusions: Patients with brainstem stroke appear to recover more quickly and are discharged home more frequently compared with patients with hemispheric stroke. Patients can make satisfactory recoveries as highlighted by two cases studies.



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A SYSTEMATIC REVIEW OF THERAPEUTIC INTERVENTIONS FOR DYSPHAGIA POST STROKE

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This project was funded by a grant from the Canadian Stroke Network

Purpose: Despite the perceived association between dysphagia treatment and a reduction of serious complications including aspiration pneumonia, there is very little evidence to support the use of many of the therapies.

Methods: Using multiple databases to search for relevant studies, we conducted a systematic review of all randomized controlled trials (RCTs) evaluating the efficacy of the treatments associated with dysphagia therapy. Fifteen articles were retrieved assessing a broad range of treatments, most provided within the first several weeks post stroke: texture-modified diets (n=4), dysphagia therapy programs (n=2), non-oral (enteral) feeding (n=3), medications, including antihypertension agents, levodopa or its agonists and selective decontamination of the digestive tract (n=4) and physical stimulation (n=2). Study sample sizes ranged from 17 to 859. Results are reported based on the most frequently cited clinically relevant outcomes.

Results: Pooled analyses were conducted where possible. Dysphagia treatment was collectively associated with a reduction in the odds of pneumonia following stroke (OR: 0.36; 95% CI 0.23 to 0.54), however, treatment was not associated with a reduction in the odds of either death (OR: 0.83; 95% CI 0.68 to 1.02) or death and dependency, defined as a Modified Rankin score of four or greater (OR: 1.04; 95% CI 0.81 to 1.34). The other most frequently reported outcome was malnutrition. The results from two trials suggested that patients randomized to receive percutaneous endoscopic gastrostomy feeding tubes experienced fewer treatment failures (ie. blocked feeding tubes) and had fewer indicators of malnutrition compared with patients who were fed by nasogastric tubes. The outcomes assessed from the remaining trials are reported descriptively.

Conclusions: While dysphagia is known to be a common and potentially serious complication of stroke, there is a dearth of evidence to support the effectiveness of many commonly used treatments. There is a clear and pressing need for quality research in the area of dysphagia management post stroke.



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THE STROKE REHABILITATION EVIDENCE-BASED REVIEW (SREBR)

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This project was funded by a grant from the Canadian Stroke Network

The Stroke Rehabilitation Evidence-Based Review (SREBR) examined both therapy-based and pharmacological interventions associated with stroke rehabilitation.

Methods: Multiple databases were used to conduct an exhaustive search strategy of all studies published between 1968 and 2006. The SREBR emphasizes the results from randomized controlled trials (RCTs) to assess the strength of evidence using a levels of evidence approach. The methodological rigor of individual studies is also evaluated using a point base system in which the maximum score is 10. [Physiotherapy Evidence Database, (PEDro)].

Results: The 9th edition of the SREBR was released in September 2006 and is freely available on the Internet (www.ebrsr.com). This most recent edition includes the results from 700 RCTs, of which 130 are related to secondary prevention of stroke. The remaining 570 RCTs studied therapies, technologies or medications related to stroke rehabilitation. The mean sample size for RCTs of stroke rehabilitation interventions was 131 (minimum: 4, maximum: 4,964), which was smaller than those evaluating strategies for secondary prevention (mean=4,695, minimum: 25, maximum: 24,418). The median PEDro score of secondary prevention trials was 8 (interquartile range = 1) and 6 (interquartile range = 2) for stroke rehabilitation trials. Absence of concealed allocation, blinding of subjects and intention to treat analysis were the most frequent methodological deficiencies encountered. Overall, there were 91 strong (>1 RCT of fair quality) levels of evidence, 125 moderate (1 RCT of fair quality) levels of evidence, 6 limited (non RCTs) levels of evidence and 26 conflicting levels of evidence. Pooling the results from individual trials where possible, we completed 21 meta-analyses.

Conclusions: The research basis for stroke rehabilitation interventions is impressive and continues to grow, despite flaws in methodology and, on average, relatively small sample sizes for trials not relating to secondary prevention.



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THE IDEAL MENTOR... DO WE AGREE?

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Objectives of the study: We wanted to determine if residents and faculty agree on the characteristics of the ideal mentor.

Methods: The study was questionnaire based. We mailed it to 542 staff and 442 residents at all the postgraduate medical training programs at University of Manitoba. It enquired about the characteristics that would be found in an ideal mentor. Based on current literature, 20 characteristics of a mentor were gathered into four categories: Supervisor, Teacher, Physician and Person. Participants were asked to rank each item according to its importance ranging from (0-4). We received responses from 162 staff and 120 residents. Responses were categorized into a dichotomy grouping [Most important (4)/ More important (3)/ Important (2)] Vs [Least important (1) /not ranked (0)]. Mentors responses were compared to trainee's responses using Chi-square statistics.

Results: Residents and faculty agreed on 18 out of 20 characteristics. The most important characteristics of an ideal mentor were in the following order: Communication skills, feedback skills, respect for the trainee, role modeling, teaching skills and competent in his/her field. The two characteristics on which faculty and residents disagreed were the enjoyment in working with the mentor and his ability to give career advice. Both groups agreed that good mentors represent $\leq 50\%$ of faculty staff.

Conclusion: The high level of agreement seen on the characteristics of the ideal mentor can help residency programs identify their ideal mentors. Our result also strongly supports faculty development programs designed to help faculty improve their mentoring skills.

Key Words: Mentors; Trainees; Relationship; Questionnaire; Chi-square; Agreement.



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MEDICAL PROBLEMS ASSOCIATED WITH PLAYING THE GREAT HIGHLAND BAGPIPE

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Utilizing a survey adapted from the National Flute Association Medical Problems Survey, 123 respondents indicated that common sites of symptoms associated with playing the Bagpipe included left arm (32%), low back (32%), finger coordination (21%), hand (15%), shoulder (11%) and neck (19%). Similar areas of impairment have been reported in studies of other wind instruments (Oboe, Bassoon and Flute). Complaints were commonly pain or stiffness in the affected region. Unique to the bagpipe are the ergonomics of maintaining constant reed pressure and airflow, therefore requiring prolonged durations of static forces to be maintained as well as the need for embellishments to separate and highlight notes. Given the 9 note scale, embellishments of up to 10 grace notes may be required for one theme note. An advanced variation (part) within the music may have more than 600 embellishing notes resulting in a far greater potential for overuse syndromes. Although areas of reported symptoms were similar to published results for other wind instruments, the prevalence of symptoms was less.



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IMPACT OF CARING FOR INDIVIDUALS WITH STROKE ON PHYSICAL HEALTH AND FUNCTION OF INFORMAL CAREGIVERS

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Purpose: Caring for a person who has experienced stroke can be a formidable task and the demands placed upon the often unskilled and inexperienced caregiver may be perceived as overwhelming. The majority of published studies focus on the well-being and mental health of the caregiver; however, caregivers may experience both mental and physical effects as a result of providing continuous support. A literature review was conducted to evaluate the impact of providing care to a family member with stroke on the health and physical functioning of informal caregivers.

Method: Searches of the literature on multiple databases were conducted to identify longitudinal studies examining the physical health or physical function of caregivers from 1996 – 2006.

Results: 10/11 identified studies reported no significant change in caregiver health/physical function over study periods ranging from 1 to 23 months. Three studies compared caregiver scores on individual subscales or the physical component summary (PCS) of the SF-36 to age and sex matched norms; only one reported lower PCS scores at 6 and 12 months post stroke. A single study, comparing outcomes for caregiving and non-caregiving relatives, found that caregivers reported significantly worse physical function at one year post stroke. Four studies examined the influence of patient characteristics; two reported no association, one reported higher patient ADL and IADL to be associated with better caregiver health and one reported an association between carer health and patient participation in ongoing therapy.

Discussion: While poor physical health may be associated with increased strain, stress or depression and decreased mental health and well-being, these studies suggest that informal caregiving does not appear to result, necessarily, in reduced physical health and function over time.



ASSESSMENT OF PARTICIPATION OUTCOMES IN RANDOMIZED CONTROLLED TRIALS OF STROKE REHABILITATION INTERVENTIONS

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Purpose: While the focus of rehabilitation following stroke has been improvement in individual functioning, there is a growing recognition of the importance of understanding the impact of interventions on the individual's ability to participate in social roles and activities. The current investigation attempted to determine to what degree this awareness has been translated into the assessment of participation outcomes within the published research literature.

Method: All cited study outcomes and measurement scales in the 491 randomized controlled trials (RCTs) included in the Stroke Rehabilitation Evidence-Based Review at the end of 2005 were recorded. Level of outcome assessment was classified according to the International Classification of Functioning Disability and Health (ICF) framework.

Results: Trend analyses demonstrated a significant increase in number of studies from 1968 - 2005 as well as significant increases in assessment of participation outcomes over time. From 1968 – 1988, there were no participation measurement citations recorded for 19 of 20 years. In total, assessments at the level of Body Structure/Function accounted for 55.8% of all measurement citations. Activity citations accounted for 33% while assessment of participation and of contextual factors each accounted for approximately 5%. Two hundred and seventy-nine studies (56.8%) reported assessment pertaining to more than one dimension and of these, 25% included assessment of Participation outcomes.

Discussion: It has been suggested that the most important outcomes in rehabilitation trials are assessments of activity and certainly, the vast body of work within the area of body function/structure is a cornerstone for rehabilitation. This is certainly reflected in the recorded measurement citations. However, despite increasing awareness and a significant increase in the use of participation assessment, relatively few studies include assessment at this level, thereby limiting our understanding with regard to the impact of rehabilitation interventions on more complex areas of social participation or life behaviour.



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PSEUDOANEURYSM CAUSING RESIDUAL LIMB PAIN - A CASE HISTORY

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Pseudoaneurysm formation is a rare but known complication following amputation. We report the clinical and radiological findings in a 45 year old man who presented with severe residual limb pain one month after an elective left below knee amputation for chronic regional pain syndrome. The pain did not respond to high doses of opioids. Duplex ultrasound imaging indicated the presence of a pseudoaneurysm in the anterior tibial artery. Aneurysm embolectomy using wire coils improved pain level and medications were reduced. We provide a literature review of pseudoaneurysm formation, diagnostic considerations and treatment options.

Key Words: Rehabilitation; Amputation; Aneurysm, False; Pain.



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IMPACT OF COMORBIDITIES ON THE PREDICTION OF FUNCTIONAL RECOVERY POST STROKE

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Purpose: In adult rehabilitation, it has been reported that the odds of full functional recovery decrease as the number of comorbid conditions increase. The purpose of the present study was to identify common comorbidities in stroke patients and determine if either the total number of comorbidities or specific individual comorbidities contributed to the prediction of clinically significant functional recovery over the course of inpatient rehabilitation.

Method: Pre-existing comorbidities identified from patient admission histories, admission and discharge FIM scores and FIM change were recorded via retrospective chart review for 935 patients admitted to three inpatient stroke rehabilitation programs from 1997 – 2003. FIM change was dichotomized around the minimally clinical important difference (MCID) for FIM change.

Results: Approximately 55% of patients recorded improvements in FIM of ≥ 22 . Comorbidities reported in more than 5% of patients were identified as follows; hypertension, diabetes, high cholesterol, atrial fibrillation, arthritis, ischemic heart disease (including angina, MI and CAD), vision problems, hypothyroidism, congestive heart failure, cancer, COPD and depression. Total number of comorbidities was not correlated with clinically important FIM improvement. Significant associations were found between clinically important FIM improvement and the presence of vision problems and hypothyroidism. Using the backward elimination method of logistic regression, all 12 common comorbidities were entered into the model in addition to sex, age and admission FIM. The final model to predict clinically significant FIM improvement included age, admission FIM, vision problems, hypothyroidism, congestive heart failure and depression ($R^2 = 0.143$).

Conclusion: While previous reports suggest that the odds for full functional recovery decrease as the number of comorbidities increase, the present study could not confirm this finding. Specific comorbidities such as vision problems, congestive heart failure, hypothyroidism or depression, and presumably the severity of such conditions, may be more predictive of functional improvement.



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PROSTATE CANCER PRESENTING AS ACUTE PERIPHERAL NEUROPATHY

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Objective: To report a case of a 59 year old a man presenting with severe generalized muscle weakness of sudden onset associated with numbness in the feet and hands.

Methods:

N/A

Results: Based on electrodiagnostic evaluation, a diagnosis of sensorimotor demyelinating generalized neuropathy with secondary axonal changes was made. Laboratory investigations showed a normal complete blood count with negative anti-nuclear and anti-neutrophil cytoplasmic antibodies. Prostate-specific antigen (PSA) was 131 ng/ml and digital rectal examination revealed a firm prostate. Even though the skeletal bone survey was normal, bone scan demonstrated extensive bony lesions indicative of metastatic disease. Ultrasound of the prostate showed diffuse heterogeneity of the prostate with focal hypoechoic regions seen bilaterally in the peripheral zone. A prostatic biopsy demonstrated adenocarcinoma involving both sides extensively. The patient was treated with intravenous immunoglobulins (IVIG) 2g/kg over 6 days and showed a marked improvement in strength.

Conclusion: We conclude that acute generalized demyelinating sensorimotor neuropathy may be the first manifestation of an underlying malignancy including adenocarcinoma of the prostate, and this may respond to treatment with IVIG.

Keywords: polyneuropathy; case report; cancer prostate; bone scan



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FALLS SUSTAINED DURING INPATIENT REHABILITATION IN A GROUP OF INDIVIDUALS WITH LOWER LIMB AMPUTATION: PREVALENCE AND PREDICTORS

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Objective: The purpose of this study is to identify risk factors for falling and fall-related injury among a group of inpatients undergoing rehabilitation following major lower extremity amputation.

Design: Retrospective cohort.

Results: Out of 1267 patients, 260 (20.5%) fell at least once. There were a total of 374 falls, 67 (17.9%) of which resulted in one or more injuries. Adjusted odds ratios and 95% confidence intervals were calculated for factors significantly associated with falling, including age 71 years or older (OR = 1.40; 95% CI = 1.02-1.89), lengths of stay of 22-35 days (OR = 2.97; 95% CI = 1.14-7.72) or greater than five weeks (OR = 6.07; 95% CI = 2.34-15.71), four or more comorbidities (OR = 1.93; 95% CI = 1.09-3.41), cognitive impairment (OR = 1.68; 95% CI = 1.02-2.78), two or more PRN medications (OR = 1.81; 95% CI = 1.02-3.21), PRN benzodiazepines (OR = 2.22; 95% CI = 1.24-3.96), and PRN opiates (OR = 5.76; 95% CI = 3.29-10.09). Factors significantly associated with fall-related injuries included bilateral amputation (OR = 3.68, 95% CI = 1.49-9.05) and falls during the day shift (OR = 2.63, 95% CI = 1.24-5.57).

Conclusions: One in five patients with lower extremity amputation will likely experience at least one fall during inpatient rehabilitation, with 18% suffering an injury. Ongoing research is required to develop appropriate intervention strategies to ameliorate fall risk during inpatient rehabilitation.

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DRIVING PEDAL REACTION TIMES FOLLOWING RIGHT TRANSTIBIAL AMPUTATIONS

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Objective: To help determine if right transtibial amputees have the potential to safely operate the foot pedals of a vehicle with their prosthetic foot, and to determine what driving technique is associated with the fastest reaction times.

Methods: This study utilized a repeated measures design where participants' reaction, movement, and response times were tested repeatedly across four different pedal configurations during a single session. Brake pedal response times were measured using four different driving techniques: right-sided accelerator with (1) prosthesis operating accelerator and brake, (2) prosthesis operating accelerator and left foot operating brake, (3) left foot operating accelerator and brake, and (4) left-sided accelerator with left foot operating accelerator and brake.

Results: Seven male and three female patients with right-sided transtibial amputation (53.1 ± 9.46 years) who attended the outpatient amputee rehabilitation clinic participated in this study. Total response times were slowest using a two-footed driving technique (1,321 msec, $p < .001$). Total response times were comparable using a left-sided accelerator with left foot operating accelerator and brake vs. the prosthesis operating accelerator and brake (1071 vs. 1098 msec, $p > .05$). Using the left foot to operate both the accelerator and brake in a conventional right-footed accelerator design led to the fastest reaction (373 msec, $p < .001$) and total response times (1027 msec, $p < .01$), although it is unclear if this is a realistic driving technique for all amputees.

Conclusions: This study suggests that right transtibial amputees should be instructed not to drive with a two-footed technique, and that they have similar pedal response times using their prosthesis as compared to a left sided accelerator.

Acknowledgement: This project was funded by a research grant provided by the Workplace Safety and Insurance Board (Ontario).

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EFFECTS OF ANESTHESIA ON PAIN AFTER LOWER-LIMB AMPUTATION

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Objective: To evaluate the effects of epidural, spinal and general anesthesia on pain after lower-limb amputation.

Design: Cross-sectional survey.

Setting: Postamputation clinic.

Patients: 150 patients who were evaluated one to 24 months after their lower-limb amputation.

Interventions: Patients received epidural, spinal, or general anesthesia for their amputation.

Measurements: Standardized questions were used to assess stump pain, phantom sensation, and phantom limb pain preoperatively and postoperatively. Pain intensity was assessed on a verbal rating scale of 0 to 10. After the interview, each patient's medical history and anesthetic record were assessed.

Results: Patients who had received epidural anesthesia and those who had received spinal anesthesia recalled significantly less pain in the week after their surgery ($P < 0.05$). After an average of 14 months, there was no difference in stump pain, phantom limb sensation, or phantom limb pain between patients who received epidural anesthesia, those who received spinal anesthesia, and those who received general anesthesia for their amputation. Phantom limb pain continued to be frequent and severe despite patients' use of opioid analgesics, amitriptyline and gabapentin.

Conclusions: Patients who received epidural anesthesia and those who received spinal anesthesia recalled better analgesia in the first week after their amputation than did patients who received general anesthesia. Anesthetic technique had no effect on stump pain, phantom limb sensation, or phantom limb pain at 14 months after lower-limb amputation.

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OUTCOME OF FOLIC ACID THERAPY: A PROSPECTIVE STUDY IN POPULATION WITH HYPERHOMOCYSTEINEMIA AND END STAGE PERIPHERAL ARTERIAL DISEASE

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Introduction: Homocysteine is a product of metabolization of methionine in the body. It can be either metabolized back to methionine in the presence of folic acid or converted to cysteine and taurine using vitamin B6 and B12 as cofactors. Deficiency of any of these vitamins can cause increase in the blood homocysteine levels. Other factors that can cause hyperhomocystenemia include genetic disorders, chronic medical conditions and drugs. Hyperhomocystenemia has been identified as an independent risk factor for coronary artery disease, cerebrovascular disease and peripheral arterial disease. There has been extensive research on hyperhomocystenemia in coronary artery disease; however, its relationship with peripheral arterial disease has not been explored widely. The focus of our study is to evaluate the prevalence of hyperhomocystenemia in the population undergoing amputation due to peripheral arterial disease. The associated events that we are analyzing as primary end points include acute coronary syndrome, reamputation and mortality in this population.

Material & Methods: Over a three year period from Jan. 2003 to Jan. 2007, 151 patients undergoing first amputation due to peripheral arterial disease were recruited for this study. Blood homocysteine levels were tested using fluorescence polarization immunoassay technique.

Results: In our population, 91 out of 151 patients showed hyperhomocystenemia. We also found that 62% of males tested had hyperhomocystenemia as compared to 52% of the females tested. The homocysteine levels dropped significantly at the end of 1 year of therapy with folic acid. We also observed that at the end of 2 years the homocysteine levels in 4 out of 5 patients decreased further below their levels after 1 year of folic acid therapy. This suggests that this effect may be cumulative and long-term therapy with folic acid may be beneficial. In our cohort, the rate of contralateral reamputation was 15% and the mortality rate was found to be 9%.

Conclusions: The prevalence of hyperhomocystenemia was 60% in this population, which is more than our previous finding of 35%. Folic acid therapy can be used to reduce blood homocysteine levels in amputee patients with hyperhomocystenemia. The rate of reamputation and other complications in folic acid treated population was lower than that reported in other studies. There is a need for more randomized prospective studies of this kind to understand the exact prevalence and implications of hyperhomocystenemia in the amputee population.

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THE USE OF BOTULINUM TOXIN FOR TREATING SEVERE URINARY FREQUENCY IN NEUROGENIC DETRUSOR OVERACTIVITY: 2 CASE REPORTS OF IMPROVING QUALITY OF LIFE

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Objective: To report two cases of botulinum toxin into the detrusor muscle in neurogenic detrusor overactivity for debilitating need for frequent intermittent catheterizations, rather than for the more studied indication of treating incontinence.

Methods: People with spinal cord injury, tending to be young, will often catheterize as often as possible to prevent being incontinent, such as our 2 subjects. Subject AA, 33-years old, was unemployed and home-bound because he needed to catheterize every hour during the day and every 2 hours at night to avoid incontinence. Subject BB is a 39-year old female who is a busy professional and has very young children. She catheterized every 1-1 1/2 hours to remain continent, and had severe urgency, being extremely difficult for her given her busy lifestyle! The alternative of incontinence was not acceptable to her. Anticholinergics were ineffective. Both patients were injected with 300IU of botulinum toxin type-A into the detrusor muscle.

Results: At three-week follow-up, both subjects reported extreme satisfaction with the outcome. AA was now catheterizing every 4-5 hours during the day, and could go 8 hours/night without catheterizing! BB had a decreased frequency of catheterizations to every 3-4 hours, decreased urgency, and increased catheterization volumes from 150 cc to 350cc average. Reported increase in quality of life was from 1/10 (0 being extremely poor) to 9/10 post-injection in AA and from 3/10 to 9/10 in BB.

This lasted seven months in AA, nine months in BB, thus repeat injections were performed, again with excellent results.

Discussion: The studies thus far enroll only patients that have incontinence as the primary problem, thus patients such as this would have been excluded. However, they had intolerable neurogenic detrusor overactivity with catheterization frequency and urgency that has been greatly helped with botulinum toxin, and their lifestyle has improved dramatically as a result.



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EFFECTS OF STRESS, SMOKING, CAFFEINE, AND ALCOHOL USE ON PAIN PERCEPTION

Joy Wee, Wilma Hopman

Objective: To examine the relationship between stress, smoking, caffeine, and alcohol use on pain perception.

Methods used: Prospective recruitment of subjects referred for nerve conduction studies. One standard stimulation each of 50 milliamperes (mA) and 100 mA was applied consecutively to an asymptomatic extremity at the beginning of the electrodiagnostic session, using consistent equipment and settings. Stimulations were applied by the same investigator, using consistent technique. Subjects used a visual analogue scale (VAS) to indicate level of pain felt after each stimulation. Information about stressors, coping, smoking, caffeine and alcohol consumption, and documented signs of stress was obtained. An individual with no subject contact verified a random sample of 10% of VAS scores.

Results: 117 men and 215 women were included. 22% consumed alcohol regularly. 83% consumed caffeine. 33% were current smokers, and 39% were currently exposed to smoke. Current smokers and those currently exposed to second hand smoke had significantly higher pain ratings ($p < 0.001$) than those not currently exposed to smoke. Time since exposure was negatively associated with pain ratings. Numbers of stressors, and signs of stress correlated strongly with level of pain reported. Those showing signs of stress, or who had more stressors, reported poor coping ability. Linear regression modeling indicated that current exposure, regular alcohol use, and stress were associated with higher pain ratings, while caffeine use was associated with lower pain ratings.

Conclusions: Exposure to cigarette smoke is significantly related to higher reported pain perception to electrical stimulation in this study population. Combined exposure to smoke and signs of stress can add approximately 25 points to the 100 point VAS as compared to subjects with neither characteristic. Reported pain decreases as length of time since previous exposure increases.



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MEDIAN NEUROPATHY IN A RARE CASE OF DEFORMING PACHYDERMODACTYLY

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Objectives:

1. To report a case of pachydermodactyly presenting with deformity and functional limitation of the fingers.
2. To provide the first evidence of median nerve neuropathy in a patient with this disorder.

Methods:

N/A

Results: A 39 year-old male chef of Korean ancestry, presented for the first time to a Physiatrist with a 15 year history of slowly progressive deformation of the fingers of his left hand at the PIP joints without a history of trauma. In the last 2 years he developed similar changes in his right dominant hand. He sought medical attention because of functional impairment related to his grip strength. It had affected cooking related activities including: opening jars; reliably gripping his chef's knives and handling food such as shrimp. The connective tissue screen and musculoskeletal system review was unremarkable. There was a family history of hypermobility in his aunt and daughter. On examination, the degree of flexion deformity at the PIPs of the third digit bilaterally and at the PIPs and DIPs of the fourth and fifth digits was striking. Incipient swan neck and boutonnière deformities were present. Soft tissue swelling was also noted at the third PIP bilaterally but there was minimal discomfort on palpation. Laboratory studies and nuclear bone scan were normal. Radiographs revealed palmer and lateral subluxation of the PIP joints of the third and fourth digits. Electrodiagnostic studies showed moderate median neuropathy at both wrists with the right hand slightly more affected than the left. Surgical exploration of the right third PIP demonstrated a thickened joint capsule. Pathology found increased collagen deposition in the superficial and deep dermis and absence of findings to suggest either inflammation or malignancy. These features were consistent with pachydermodactyly.

Conclusion:

1. We report a case of pachydermodactyly, a rarely occurring non-inflammatory joint disease, causing significant functional limitations.
2. Nerve conduction studies demonstrated compression of the median nerve at the wrist that might be secondary to abnormal collagen deposition in the carpal tunnel.
3. To the best of our knowledge this is the first report of electrophysiological findings in a patient with pachydermodactyly. This finding identifies a treatable factor that may be contributing to functional limitation in this disease.



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REHABILITATION OF COGNITIVE DEFICITS POST-ACQUIRED BRAIN INJURY

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Purpose: To review the interventions available to remediate cognitive deficits related to a moderate-to-severe acquired brain injury (ABI).

Background: The ERABI group has conducted a review of the scientific literature on ABI. This comprehensive review is published and updated regularly at http://www.abiebr.com/index_home.html One of the modules reviewed the interventions available to remediate cognitive deficits related to an ABI.

Methods: The literature was searched for studies examining the effectiveness of cognitive intervention(s) following moderate-to-severe ABI. These deficits included general cognitive functioning, executive functioning, learning, memory, attention, concentration, and information processing speed. PubMed, Cinahl, PsycINFO, and Embase were the databases used to search the literature. Studies were only included if an intervention was being examined, individuals with ABI comprised 50% of the study population, and the study population included 3 or more people. Included articles were reviewed and summarized in tables.

Results: This review examined four major areas of cognitive therapy: attention and concentration; learning and memory; executive functioning; and general cognitive rehabilitation approaches. In total, 64 studies were evaluated throughout the four major areas, which provided the evidence for 18 conclusions. The majority of the conclusions were based on moderate and limited evidence; however one conflicting and three strong conclusions were also made.

Conclusions: Future research should explore functional outcome measures and long-term effects of treatment interventions through follow-up.



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MARRIAGE AFTER ACQUIRED BRAIN INJURY: A REVIEW

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Purpose: To review the literature and identify the effects on marital relationships after one partner has acquired a brain injury.

Relevance: This work aims to reveal the feelings and change in dynamics experienced within a marriage that has suffered a brain injury, as the spouse of the person with brain injury can often influence rehabilitation success.

Methods: CINAHL, EMBASE, PsycINFO, and PubMed were searched for relevant English articles. All articles examining the effects of an acquired brain injury on marriage or other couple-type relationship were included for analysis. For this review, acquired brain injury included traumatic and non-traumatic etiologies. A hand search of reference lists was also completed to identify further articles. Selected articles were extracted and then summarized by category in tables.

Results: Brain injury has a significant impact on not only the person with brain injury, but also the non-injured spouse. Marital satisfaction was frequently reported as less than pre-injury by both partners in the relationship. The new role of the non-injured spouse within the family often included caregiving duties, greater parental control if children were present, and financial responsibility. Furthermore, deficits in communication of feelings, interpersonal relationships with friends and other family members, sexuality, and intimacy were reported. Divorce and separation occurred at varying rates following brain injury. Mutual satisfaction with the marriage was found to be related with perceived participation in social and leisure activities and the couple's ability to function as a unit in everyday life.

Conclusions: Addressing the needs of both the person who has suffered a brain injury and the non-injured spouse during rehabilitation may help promote a healthier marriage post-brain injury. More longitudinal research needs to be conducted in order to better understand the long-term effects of brain injury on marriage and in turn, the effects of marriage on rehabilitation success.



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A COMPARISON OF THE PEDRO AND DOWNS AND BLACK QUALITY ASSESSMENT TOOLS IN THE ERABI

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Purpose: To examine the relationship between the PEDro and Downs and Black scores for the randomized controlled trials (RCT) that were included in the evidence-based review of moderate to severe acquired brain injury (ERABI).

Objectives: 1) To compare the overall scores from both scales and 2) to examine the relationship between the scores of equivalent questions from both scales. This involved evaluation of a modified (i.e., subset) D&B score and total PEDro score.

Methods: 134 articles were identified as RCTs and each of these articles were scored using PEDro and Downs and Black checklists. All scores for each question were entered into the statistical database SPSS. The PEDro scale consists of 10 questions whereas the D&B scale consists of 27 questions. The items on both scales were compared to identify which questions from each scale addressed the same information from the RCT. Once completed, a total of 13 questions from the D&B scale were deemed to be equivalent to the questions on the PEDro scale, and the responses to these questions were compared. The resulting scores from the two scales were then evaluated for reliability.

Results: The association between the overall PEDro and Downs and Black scores were moderately high ($r=0.68$, $p<0.001$) indicating a significant relationship between the two quality assessment tools. When considering the modified Downs and Black scores which contained a subset of questions deemed most comparable to the PEDro scale the correlation between the two was slightly lower ($r=0.59$, $p<0.001$).

Conclusion: Further analysis is required to investigate if there are a particular subset of questions in the Downs and Black scale more closely related to the PEDro scale.



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COMMUNITY REINTEGRATION FOLLOWING ACQUIRED BRAIN INJURY

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Purpose: To evaluate the interventions and strategies used to enable transition from acute care or post-acute rehabilitation to the community following brain injury.

Methods: A systematic review of the literature from 1980 to 2006, was conducted to identify all published literature that evaluated the effectiveness of any treatment or intervention related to acquired brain injury. Five major aspects of community reintegration, including: independence and social integration, caregiver burden, satisfaction with quality of life, productivity and return to driving were investigated. Studies where at least 50% of the study population included subjects with moderate to severe ABI and which involved the evaluation of a treatment with measurable outcomes were selected for full review. All randomized controlled trials (RCTs) were then evaluated using the PEDro and Downs and Black evaluation tools. Non-RCTs (prospective, retrospective and non-experimental designs) were evaluated using the Downs and Black evaluation tool only. These scores were then used to assign a level of evidence for each study that was evaluated. Reviews were summarized in tables.

Results: With the exception of one, the majority of interventions are supported by only limited evidence, denoting an absence of randomized controlled trials (RCTs) in the literature. Of thirty-eight studies evaluated for this review, only one RCT was found. That RCT provided moderate evidence that behavioural management, coupled with caregiver education, did not help to improve caregiver burden.

Conclusions: Further research, using an interventional approach, is required to advance the evidence base of reintegration into the community following brain injury.



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THE ACCEPTABILITY TO OLDER DRIVERS OF DIFFERENT TYPES OF LICENSING RESTRICTION

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The primary objective of this study was to determine the acceptability of various driving restrictions to older drivers. Licensed drivers aged 65 years or more living in the community in the Ottawa, Ontario area were recruited by means of posters and advertisements in regional and local newspapers. We recruited 86 subjects, 56 men and 30 women with a mean age of 75 years (50 urban and 36 rural residents). The subjects completed a one-hour interview with one of two trained study nurses during which their driving restriction preferences (utilities) were determined using a modified standard gamble technique. Highly endorsed restrictions included regular assessment by the Ministry of Transportation (mean utility 0.94), driving with vehicle adaptations (0.94) and daytime driving only (0.93). Less acceptable restrictions included avoidance of roads with a speed limit greater than 60 km/h (0.50), limitation of destinations (0.45), driving only within a 10-km radius of home (0.45) and requirement of another licensed driver in the vehicle (0.42). Our subjects' preferences appeared to be inversely related to the impact on autonomy and the ability to access the community. These findings may be useful to motor transport administrators in designing effective restricted licensing programs that are acceptable to older drivers.



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CONSUMERS VERSUS PROVIDERS IN THE RATING OF THE IMPACT OF SECONDARY CONDITIONS FOLLOWING SPINAL CORD INJURY ON DAILY LIFE

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In a survey of healthcare providers, 50 respondents representing a variety of disciplines with a mean duration of experience as service providers of 14.8 years \pm 10.3(SD) described their experience in the management of secondary sequelae of spinal cord injury. Nurses (28.6%), physiotherapists (25.6%), occupational therapists (14.3%), social workers (8.2%) and case managers (8.2%) represented the most prevalent disciplines among the respondents. Survey respondents reported that they had treated an average of 18.8 individuals with SCI \pm 26.7 (SD) in the current year and 24.2 \pm 43.7 (SD) in a typical year. For the most part, these providers were not solely providing services to SCI consumers (i.e., 79.6% indicated they spent less than 50% of their time delivering services to SCI consumers). The most frequently reported conditions within each category that both consumer and provider respondents identified as having at the time of the survey included the presence of I) spasms, pain and sexual dysfunction (68.1%, 65.7% and 50.7% respectively), II) fatigue, shoulder pain or other repetitive strain injury and being overweight (57.0%, 56.5% and 37.7% respectively) and III) hemorrhoids, urinary tract infections (UTIs) and pressure sores (37.2%, 29.0% and 19.8% respectively). Providers rated specific conditions as having a greater impact on one's daily life than did consumers. Of the more frequent conditions, several were rated as having significantly higher impact by providers as compared to consumers including pressure sores ($p<.001$), spasms ($p=.002$) and shoulder pain or other repetitive strain injury ($p=.014$) as assessed by the Kolmogorov-Smirnov Z test (a non-parametric test of distribution differences).



**IMPACT OF SECONDARY CONDITIONS FOLLOWING SPINAL CORD INJURY:
THE CONSUMER'S PERSPECTIVE**

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In a survey of spinal cord injured persons, 207 persons (22.5% response rate) of mean age 49.4 (SD 14.3) years and 12.5 (SD 16.5) years post injury rated the impact of common conditions on their daily life. Each of the conditions rated (except hemorrhoids) were rated by consumers as having a moderate or greater impact on daily life at least by 50% of respondents with sexual dysfunction (75.4%), pain (70.7%) and shoulder pain or other repetitive strain injury (69.8%) most often rated as moderate to very severe. Sexual dysfunction had the most respondents indicating a severe or very severe impact (44.9%), followed by pain (36.8%) and pressure sores (34.0%). Only a small percentage of ratings indicated that there was no impact on daily life. In considering solutions, respondents who had suffered their injury more than 10 years prior were more likely to recommend the need for more self-care information to be provided at the time of inpatient rehabilitation. Persons whose duration of injury was 5-10 years did not suggest the need for more information to manage secondary complications.



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JOINT CONTRACTURES: ARE WE ALL MADE EQUAL?

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Objective: To submit 4 different in-bred rat strains to knee joint immobilization and measure the severity of the joint contracture.

Methods: 40 rats had one knee joint immobilized with internal fixation. They were of 4 different in-bred strains, n=10 each: Dark Agouti, Fisher 344, Augustus Copenhagen Irish and Brown Norway. After 4 weeks, the immobilization was removed and the range of motion in extension measured with a spring-loaded goniometer. Results were compared using independent t-tests.

Results: Weight at harvest was different between groups but did not correlate with the contracture ($p=0.894$). Similarly, range of motion of the contralateral leg differed among the strains. After correction using the contralateral legs, knee joint contractures in 2 strains (DA and Fisher) were found to be significantly larger than in the other two strains (ACI and BN, all $p<0.05$).

Conclusion: Previous work showed that immobilization in flexion alters the posterior knee-joint tissues, creating a contracture. The present results demonstrate that genetic constitution is instrumental in determining the severity of the contracture. This could account for the wide variation in susceptibility to joint contractures that we see clinically in people with limited mobility. Before undergoing any prolonged immobilization, if patients could be screened for risk of contractures, and those at higher risk targeted for preventive intervention, there would be benefits to both patient and health care system. Further research should focus on the key genetic mediators of susceptibility and resistance to joint contractures secondary to immobility.



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FAILURE OF CORTICOSTEROID IONTOPHORESIS TO TREAT CARPAL TUNNEL SYNDROME: A DOUBLE-BLIND RANDOMIZED CONTROLLED TRIAL

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Background: Injection of corticosteroids into the carpal tunnel alleviates the symptoms of patients with mild to moderately severe carpal tunnel syndrome. However, this procedure is not popular due to the risks attributed to injection into a limited space at the wrist. This study was designed to investigate the effectiveness of dexamethasone iontophoresis, a non-invasive method, in treating CTS.

Methods: In a double-blind randomized controlled trial, the response to six sessions of treatment with 0.4% dexamethasone sodium sulfate was compared with distilled water over six months in seventeen patients. Outcome of treatments were assessed by using nerve conduction studies, Levine's Self-Assessment Questionnaire, the Purdue Pegboard Test, and the Semmes Weinstein Monofilaments.

Results: The objective outcome measures did not show any significant improvement following treatment. A significant subjective improvement of symptom severity was detected by the Levine's Self-Assessment Questionnaire in the treatment group. However, similar change was also noted in the control group ($p < 0.05$).

Conclusion: Although corticosteroid iontophoresis is feasible in clinical settings and is well tolerated by patients, iontophoresis of 0.4% dexamethasone was not effective in the treatment of mild to moderate CTS.



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A CASE OF PROSTHETIC ACNE

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Objectives: The objective of this case report is to describe the occurrence of prosthetic acne.

Methods: We describe the clinical presentation and management of a case of an adult male with prosthetic acne on a transtibial amputation. We present photographs of the lesions and methods of successful management.

Results Obtained: We successfully treated a painful, pustular eruption at areas of friction in a transtibial amputation with standard acne management strategies.

Conclusion: Areas of friction in residual limbs fitted with prostheses can produce painful, red and pustular eruptions. These, if untreated, can progress to confluent subcutaneous sinuses. The clinical pattern is similar to that of acne variants and probably follows the same pathophysiology. Names for this presentation in other areas of the body include acne conglobata, acne inversa and hidradenitis suppurativa. The standard pharmacologic management for acne along with basic prosthetic principles for avoiding friction can successfully relieve pain and allow continuing function. To the best of our knowledge, this prosthetic complication has not been reported previously.



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DO YOU BELIEVE IN MAGIC? TEACHING MAGIC TRICKS TO PATIENTS AS AN ADJUNCT TO THEIR REHABILITATION PROGRAM

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Objective: To evaluate a pilot program involving teaching magic tricks to ABI patients undergoing rehabilitation at the Toronto Rehabilitation Institute (TRI)

Methods: From June 2006 to January 2007, simple magic tricks (from the *Healing of Magic* manual) were taught to inpatients at the TRI Neuro Rehabilitation inpatient ward. Over this study period, a total of 11 inpatients were recruited to participate in questionnaires and interviews before and after the intervention (learning magic tricks). To evaluate effects on quality of life, self-esteem, and mood, study participants were asked to complete the EQ-5D Health Questionnaire, the Rosenberg Self-Esteem Scale, and the Rand 36-Item Short Form Health Survey Instrument (SF-36). Study participants were also interviewed to evaluate the program qualitatively.

Results: Of the 11 study participants, 5 completed both the pre- and post-intervention questionnaires while 10 completed both interviews. Study participants learned magic tricks over 2-4 weeks. The mean EQ VAS health status scores increased from 70.5 ± 19 to 75 ± 15 , albeit non-significantly ($p=0.20$). The mean scores of the Rosenberg Self-Esteem Scale also non-significantly increased (22.8 ± 3.8 to 25.8 ± 5.0 , $p=0.20$). Of the eight SF-36 scales, only the “Energy/Fatigue” scale significantly increased from 61 ± 8 to 74 ± 10 ($p=0.02$). The two scales related to mood showed non-significant increases: “Role limitations due to emotional problems” (60 ± 37 to 87 ± 30 , $p=0.09$) and “Emotional well-being” (81 ± 11 to 89 ± 5 , $p=0.09$). Two underlying themes for initial interest in the program were “attending a fun and social activity” and “learning magic to show others.” Three main themes were identified from the post-intervention interviews: “interesting activity”, “challenging due to decreased function”, and “increased self-esteem when successful.”

Conclusion: Incorporating a program of teaching simple magic tricks to patients undergoing rehabilitation appears to be an effective adjunct to their regular rehabilitation program. The current pilot program at TRI can be improved using the suggestions provided by the study participants.

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REFUSAL TO EAT, CAPACITY AND ETHICS IN STROKE PATIENTS: A CASE SERIES

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Objective: To highlight the clinical and ethical challenges presented by stroke rehabilitation patients who refuse to eat.

Methods: Case reports.

Results: *Patient 1:* 73-year-old man with left brain hemorrhagic stroke who stopped eating and refused intravenous fluids. The family felt that he wished to die. He was depressed, aphasic and possibly dehydrated, but actively participated in therapies. After an “against medical advice” (to withhold nutrition) form was signed by his wife, as he lacked capacity, he resumed eating intermittently. He was discharged home under the care of his wife. Four years later he remained in his own home. *Patient 2:* 76-year-old man with right brain stroke with left hemiparesis and neuropsychological sequelae who initially refused to eat and expressed awareness of the consequences (i.e., that he could die). However, he ingested spoonfuls of food placed close to his mouth. Subsequently he started to eat partially on his own and was transferred to nursing home. *Patient 3:* 87-year-old woman with right hemiparesis and aphasia who refused to eat and to attend her rehabilitation therapies. Staff and family agreed that she lacked capacity to make medical decisions. An antidepressant was prescribed and hypodermoclysis started. A few weeks later, after an ethics consultation, the hypodermoclysis was stopped. She was transferred back to the acute care institution to await nursing home placement. One year later she had experienced significant weight loss but continued to ingest minimal amounts of food.

Conclusion: Impaired cognition, mood and appetite in right and left brain stroke patients led to refusal to eat. This situation jeopardized their health and presented an ethical challenge to the rehabilitation team. With prudent clinical care and application of the laws concerning capacity, appropriate ethical treatment of stroke patients who refuse to eat can occur.



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SATIVEX[®] (THC:CBD) OFFERS FIBROMYALGIA PAIN REDUCTION

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Objective: Fibromyalgia (FM) remains an enigmatic syndrome of chronic, widespread pain, fatigue, sleep disturbance and mood disorder. Treatments are limited with few patients reporting any benefit. Agonists of cannabinoid receptors may ameliorate FM pain. The novel buccal spray, Sativex, a preparation of THC and Cannabidiol (CBD) standardized extracts is approved in Canada for neuropathic pain relief from Multiple Sclerosis. This observational trial followed 67 FM patients for 8 weeks to evaluate pain relief from Sativex treatment.

Methods: Sixty-seven FM patients were recruited to try Sativex without alteration of other pain management medications, to reflect a “real world” trial. Pain reduction was measured via Visual Analog Scale (VAS) plus % change in Fibromyalgia Impact Questionnaire (FIQ) scores.

Results: 32/67 patients found a good or very good reduction in pain levels, plus improvement in FIQ scores. Of the 32 patients with initial pain reduction from Baseline to Week 4 of Sativex use, 20 were followed to Week 8, with 14 showing continued FIQ score reduction, and 4/5 showing very modest (<10% scores) increases from Weeks 4-8.

Mean pain VAS scores were 6.9 at Baseline; 5.8 at 4 weeks (16% reduction); 5.8 at 8 weeks. Mean FIQ scores were: Baseline –74.8 (high –100; low –33.1); Week 4 –58.9 (high –88.3; low –28.5); Week 8 –58.3 (high –81.6; low –28.2).

Side effects included drowsiness, dizziness, altered mental state. 35/67 patients discontinued Sativex, 14 due to lack of benefit and 21 due to intolerable side effects.

Conclusion: Sativex buccal spray introduces an alternative cannabinoid delivery system to inhaled cannabis for pain management. In this unique “real world” FM/Sativex trial, VAS and FIQ pain symptom improvement were seen in just under 50% of enrolled FM patients. These trial results could potentially lead to longer-term, larger-scale, placebo-controlled studies of cannabinoids, which will enhance our understanding for the role of cannabinoids in FM treatment.



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PHYSICAL ACTIVITY LEVELS IN MULTIPLE SCLEROSIS PATIENTS

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Objective: Determine the type and amount of physical activity (PA) on a cross-sectional sample of subjects with Multiple Sclerosis in Saskatchewan.

Methods: Subjects with MS seen in the Saskatoon Multiple Sclerosis Clinic in 2006 were mailed a PA survey. Demographic information was collected from a confidentiality-protected clinical database. Data were analyzed using SPSS software.

Results: Response rate was 25.8% (73/283). Responders were: Mean age 51 years (SD 12), 68.5% females, median EDSS score 2.5 (range 9). Sixty-three percent were disabled mildly (EDSS \leq 3.5), 16.4% moderately (EDSS 4-6), and 20.5% severely (EDSS 6.5-9.5). Baseline demographics were not statistically different between responders and non-responders. For responders, 95.9% did some form of moderate PA at least once weekly. Of these, 15.1% participated in group classes (mean 2.5 days/wk, SD 1.2), 61.6% in a minimum of 15 minutes of self-directed continuous activity (mean 4.7 days/wk, SD 1.8) and 90.4% accumulated small bouts of moderate PA totaling a minimum of 20 minutes daily (mean 5.7 days/wk, SD 1.7). Total activity decreased as disability increased (Spearman $r = -0.36$, $p=0.002$). There was no significant correlation between age or gender and PA. In addition to participation in the physical activities described, 24.7% of responders felt daily self care required moderate physical effort.

Conclusion: A large majority of Saskatchewan respondents with MS participate in weekly PA when multiple types of moderate PA are considered. PA decreases significantly with increasing disability. All activity sources should be considered when examining activity levels of individuals with Multiple Sclerosis.

Funding source: Department of Physical Medicine and Rehabilitation, University of Saskatchewan



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THE WHEELCHAIR-PROVISION PROCESS IN THE UNITED ARAB EMIRATES (UAE)

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Objective. To explore the wheelchair provision process in the United Arab Emirates (UAE).

Method. This was a preliminary descriptive project based on the observations of the principal investigator during a four-week visit to the UAE in February 2006. The trip was an elective rotation in international community rehabilitation as part of the residency program in Physical Medicine and Rehabilitation (PM&R) at Dalhousie University. The rotation was based at the Sheikh Khalifa Medical City (SKMC). A template of questions, developed by the Wheelchair Research Team at Dalhousie University to help understand the wheelchair-provision process in other countries, was used. Information came from the health professionals practicing at SKMC and a literature search.

Results. Rehabilitation in the UAE is organized through the general hospitals. Of the wheeled mobility that was observed, manual hand-rim-propelled wheelchairs were most commonly seen. The wheelchairs were prescribed at the hospitals and were paid for by the government for citizens or by insurance for non-citizens. The wheelchair users received limited training in wheelchair skills, depending on the availability of the occupational therapists. There were not many wheelchair users seen in the community. Of the manual wheelchair users observed, most of them were pushed by a family member or a caregiver rather than self-propelling their wheelchairs. Wheelchair-accessible transportation was limited. Social barriers appeared to exist including the hesitation of the wheelchair users to use their wheelchairs in the public places. In the UAE, there are no federal standards or guidelines and no legislation regulating the accessibility of public buildings for wheelchair users. However, almost all of the sidewalks had curb cuts and buildings were easily accessible for wheelchairs.

Conclusions. Although the wheelchair-provision process in the UAE is well-advanced, there appears to be room for improvement from the perspectives the availability of wheelchair-skills training and cultural barriers.



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A SYSTEMATIC REVIEW OF THERAPEUTIC INTERVENTIONS FOR WHIPLASH-ASSOCIATED DISORDERS

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Whiplash-associated disorders (WAD) represent a significant public health problem and socio-economic burden throughout the industrialized world. While many treatments for WAD have been advocated, support for their effectiveness has not been established; a systematic review was conducted to evaluate the strength of evidence associated with various WAD therapies. Multiple databases were searched to identify all studies published from 1980-2006 evaluating the effectiveness of any clearly defined treatment for acute (< 2 weeks), subacute (2 to 12 weeks), or chronic (> 12 weeks) WAD. Sixty-one studies were identified, of which 30 were RCTs. The majority of studies evaluated treatments initiated in the chronic stage of the disorder (n = 30). Forty-three evaluated non-invasive interventions, 12 evaluated medically-based interventions, and 6 evaluated surgical interventions. For the treatment of acute WAD, strong evidence (> 1 RCT) exists to support early mobilization with a focus on light neck exercises, while strong evidence suggests that soft collars, rest, and simple educational interventions are ineffective treatments. Interventions supported by moderate (1 RCT) evidence include both high-dose methylprednisolone infusions and advice to “act as usual” in the treatment of acute WAD; exercise and psychological counseling, as well as chiropractic manipulation of the cervical spine for subacute WAD; and botulinum toxin-A and sterile water trigger point injections for chronic WAD. Limited evidence exists for local anesthetic trigger point injections for chronic WAD. Definitive treatment recommendations cannot be made based on limited levels of evidence, and only with caution for moderate levels of evidence. Given the few strong levels of evidence, more research is warranted.



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PRESSURE ULCERS FOLLOWING SPINAL CORD INJURY: A REVIEW OF THE PREVENTION AND TREATMENT INTERVENTIONS

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Objective: To review and assess research based prevention and treatment interventions used in clinical practice for pressure ulcers following a spinal cord injury.

Method: A critical review and synthesis of prevention and treatment interventions for pressure ulcers in peer reviewed, spinal cord injury literature was conducted. Each randomized controlled (RCT) trial was rated according to the Physiotherapy Evidence Database (PEDro) for quality and non-RCTs were assessed for quality using the Downs and Black scale. Each intervention presented was then assigned a level of evidence using a modified Sackett scale.

Results: Interventions were categorized into either prevention or treatment. Of the 21 results reviewed only 7 were randomized controlled trials, and these dealt solely with treatment of pressure ulcers.

Conclusions: The published literature regarding pressure ulcers post spinal cord injury could be improved to include quality research on prevention interventions given that prevention is more cost effective than treatment. More research is needed in both areas.

This work was supported by ICORD and the Ontario Neurotrauma Foundation.



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ENHANCING UPPER EXTREMITY FUNCTION WITH RECONSTRUCTIVE SURGERY AND NEUROPROSTHESES: A REVIEW OF THE LITERATURE

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Purpose: To review the evidence for interventions in peer reviewed published literature for reconstructive surgical procedures and functional electrical stimulation (FES) in the upper extremity for persons with tetraplegia following spinal cord injury.

Method: A critical review and synthesis of articles addressing reconstructive surgical procedures and the use of FES was conducted. Each article was assessed for quality using the Downs and Black methodology for non-randomized studies and the Physiotherapy Evidence Database (PEDro) for randomized controlled trials. Interventions were categorized according to various sub topic areas reconstructive surgical procedures and the use of FES with the person with tetraplegia. Levels of evidence using a modified Sackett scale were assigned to each intervention within these categories.

Results: Each type of surgical procedure had numerous level 4 studies with reasonably large sample sizes that were conducted over many years to support the use of reconstructive surgical procedures in improving upper extremity motor and functional use of the limb with individuals with tetraplegia following a spinal cord injury. There is also level 4 evidence that supports the use of FES; however, its use has not attained widespread application.

Conclusions: There is evidence that reconstructive surgical procedures enhance upper extremity function and abilities for persons with tetraplegia. Although there is a need to improve the level of evidence it is unlikely due to ethical and logistical constraints. Research involving FES for the upper extremity has demonstrated improved outcomes; yet limitations of the body of evidence exist but these may be overcome in future research with technological and other developments.

This work was supported by ICORD and the Ontario Neurotrauma Foundation.



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JOINT CONTRACTURES IN THE INTENSIVE CARE UNIT: IS IT A MYTH?

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Objective: Find the incidence of and risk factors leading to contractures in large joints (shoulders, elbows, hips, knees, and ankles) after an intensive care unit stay of 2 weeks or more.

Method: Retrospective review of 155 charts of patients admitted to The Ottawa Hospital intensive care unit over a two-year period. Variables included: patient demographics, admission diagnosis, medical interventions, total length of stay, and documented range of motion. Contractures that limited movement to half or more of the range of motion were defined as functionally limiting.

Results: Patients' age averaged 59.6 ± 15.5 years. At intensive care unit discharge, 61 (39%) patients were documented as having at least one contracture; 52 of these patients had at least one functionally limiting contracture. A total of 192 contractures were documented for all large joints (bilateral) at intensive care unit discharge; 144 of these were functionally limiting. At the time of hospital or rehabilitation discharge, 45 patients had at least one contracture; 29 of these patients had at least one functionally limiting contracture. At that time, a total of 153 contractures were documented at all large joints; 70 of them were functionally limiting. From all of our research variables, none were significant to contracture development within the intensive care unit with the exception of an extensive length of stay of 8 weeks or more (OR 7.1, $p=0.05$).

Conclusion: This study is the first to involve contractures in all large joints. There is a high incidence of functionally limiting contractures in intensive care patients which persist until hospital discharge. Present findings indicate that more than one joint is affected by contractures. Length of stay within the intensive care unit was the only identifiable risk factor associated with joint contracture development.

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MEDICAL STUDENTS WITH “DISABILITIES” FACE STIGMA FROM THE MEDICAL COMMUNITY

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Objective: To explore attitude barriers of admission and success of Canadian medical students with “disabilities”, and to determine the prevalence of “disabilities”.

Methods: 993 students in Medicine, Law, Social Work (SW) and Occupational Therapy (OT) at University of Western Ontario were surveyed. Through open-ended questions, 7-point scales, and yes/no items, opinions regarding accommodation of students with “disabilities”, ability of students with “disabilities” to succeed, and self-identification of “disabilities” were explored.

Results: The overall response rate was 69%. The prevalence of self-identified “disabilities” was 3.2% (9/285) in medicine, and 4.9% (33/667) overall. Only 57% of medical students believed administration should accommodate medical students with “disabilities” (vs. OT-98%, SW-85.5%, both $p < 0.001$). Less medical students agreed that students should be willing to enter any field of medicine (22.3% vs. OT-49%, $p < 0.001$; SW-28.8%, $p = 0.002$). More medical students believed a medical student with a “disability” could not succeed (8.5% vs. OT-0%, $p = 0.009$). Knowledge of a physician’s “disability” would dissuade more medical students from being his/her patient (25.5% vs. OT-7.8%, SW-6.8%, both $p < 0.001$).

Conclusion(s): Attitudinal barriers exist towards medical students and physicians with “disabilities”, especially within the medical community. Further studies are needed to explore the stigma faced by medical students and physicians with “disabilities”.

Funding Source: None.



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PREVALENCE OF OSTEOPOROSIS IN OSTEOARTHRITIC PATIENTS UNDERGOING TOTAL HIP OR TOTAL KNEE ARTHROPLASTY

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Objective: This study aims to identify osteoporosis in total knee or total hip arthroplasty patients, as defined by a prior fragility fracture, prior osteoporosis diagnosis or treatment. Questions this study aims to answer include: (i) what is prevalence of osteoporosis in osteoarthritic patients undergoing total joint arthroplasty? (ii) is there a need for formal assessment of osteoporosis in osteoarthritic arthroplasty candidates? (iii) does this survey review further identify care gaps in osteoporosis management?

Methodology: The research question was answered via review of surveys completed by orthopedic outpatients, between January 2005 to December 2006, in the Specialized Outpatient Rehabilitation Service's Pre-surgical Arthroplasty Service located at Chedoke Hospital, Hamilton Health Sciences, Hamilton.

Results: Although data is still undergoing analysis, we suspect results will indicate a correlation between patients who require joint replacements, and those who are at the highest risk of osteoporosis, as both groups tend to be primarily older women. It is also expected that our results will further confirm care gaps in osteoporosis management.

Conclusions: Anticipated benefits of this study include identification of osteoporosis prevalence in osteoarthritic arthroplasty patients, and identification of the need for formal assessment of osteoporosis in these patients. These findings may highlight areas that are not receiving enough attention by health care providers, leading to increased physician and surgeon awareness regarding osteoporosis, and its treatment in arthroplasty candidates. Results may also indicate areas that require further research, such as the need to assess bone quality/quantity in patients undergoing a joint replacement.



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HOW SUCCESSFUL IS THE WSIB BACK ON TRACK REHABILITATION PROGRAM AT RETURNING WORK RELATED TRAUMATIC AMPUTEES TO EMPLOYMENT? A RETROSPECTIVE CHART REVIEW

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Background: Few studies have examined the return to work (RTW) rate of traumatic work-related amputees in Canada. An Ontario study in 1985 indicated an 89% RTW rate among traumatic industrial amputees.³ A more recent study of traumatic lower extremity amputees in Alberta indicated a 58% RTW rate.⁴ The WSIB Back on Track (BOT) Rehabilitation Program at St. John's Rehab Hospital is a multidisciplinary outpatient program that aids traumatic work-related amputees in regaining their pre-accident levels of functioning. The aim of this study was to determine the RTW rate among traumatic work-related amputees at discharge from the BOT Program.

Methods: A retrospective cohort design was utilized for this study. The medical records of outpatients who had experienced a traumatic work-related amputation and were discharged from the BOT Program were reviewed. The main outcome measure was employment status at discharge from the BOT Program.

Results: 72 traumatic work-related amputees were discharged from the BOT Program from its inception to May 31, 2006. Preliminary results indicate that the patients were predominantly male (96%) with an average age of 35. Pain was a significantly co-morbidity for these individuals as 82% and 94% experienced phantom and residual limb pain respectively. 64% of these patients also had significant psychiatric co-morbidities. 67% of these patients experienced upper extremity amputations, while 32% experienced lower extremity amputations. 1% experienced both lower and upper extremity amputations.

At discharge from the BOT Program, 34% of the traumatic work-related amputees returned to work. The majority returned to modified duties with their previous employer. 31% were deemed fit for work and were actively seeking new employment or undergoing vocational training. 4% retired and 31% did not return to gainful employment. Chronic pain, psychiatric co-morbidities and physical disability were the most frequent cited reasons why patients were unable to return to work.

Conclusions: The RTW rate among traumatic work-related amputees at the BOT Program is lower than the rates determined by previous similar studies. Increased efforts at managing chronic pain and psychiatric co-morbidities among traumatic work-related amputees may lead to a higher RTW rate.

Acknowledgements

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QUALITY OF LIFE IN BILATERAL VERSUS UNILATERAL LOWER LIMB AMPUTEES USING PROSTHESIS – INDIAN PERSPECTIVE

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Objective: To study the quality of life in bilateral versus unilateral lower limb amputees using prosthesis.

Design: Crosssectional study.

Setting: Tertiary care rehabilitation centre.

Participants: 60 consecutive lower limb prosthesis users attending OPD satisfying inclusion and exclusion criteria.

Interventions: NA.

Main Outcome Measures: Patients were evaluated by the same interviewer using a prosthesis evaluation questionnaire. Patients were divided in two groups: unilateral (U) and bilateral (B). Score for scales predicting quality of life were calculated by Summed rating Scale. Independent t-test and one way ANOVA test was undertaken for statistical analysis.

Results: Group U rated their prosthesis significantly better in appearance scale [U=70.7, B=53.3, $p=0.027$]. However no statistical significance [$p>.05$] was observed in Usefulness [U=71.8, B=62.7], Residual limb health [U=65.5, B=68.5], Sounds [U=68.2, B= 62.7], Ambulation [U=69, B=62.7], Transfers [U=65, B=66], Perceived responses [U=81.4, B=76.6], Social burden [U=64.5, B=70.6], Frustration [U=68.5, B=82.7], and Well being [U=79.5, B=74.9].

Conclusion: Contrary to previous studies our study shows that apart from appearance there is no significant difference in parameters of quality of life in bilateral prosthesis users than unilateral prosthesis users. We believe that this is due to greater increase in ambulatory status in otherwise wheelchair bound bilateral amputees than ambulatory crutch mobile unilateral amputees and thus resulting in greater increase in quality of life parameters in bilateral amputees.

Keywords: Rehabilitation, Prosthesis, Amputation.



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DOES INCOME LEVEL INFLUENCE COMPLEMENTARY MEDICINE USE WITH CHRONIC LOW BACK PAIN?

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Hypothesis: To examine low-back pain patients treated either medically or surgically, and whether their use of CAM was related to their household income

Methods: Chronic-low back pain was defined as pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal folds. Furthermore, the pain must have lasted three months or longer in the past two years, and is not attributable to cauda equina syndrome, infection, sciatica, stenosis, spinal deformity, or spinal fracture. A validated CAM questionnaire was used and income level was generated from a government survey. Recruitment was from a University tertiary back clinic of a physiatrist and orthopedic surgeon.

Results: A total of 19 patients were surveyed, including 12 who received medical treatment and who received surgical treatment for their chronic low back pain. 8/12 (67%) of medically treated patients and 5/7 (71%) of surgically treated patients tried CAM for a total of 13/19 (68%). By chi-square analysis, the number of medically versus surgically treated patients who had tried or not tried CAM was not different. Furthermore, chi-square analysis also revealed that there was no difference between different income levels as to whether they had tried CAM or not.

Conclusions:

1. Surgical patients used more CAM “mind body & spirit” and “diet and nutrition” than medical patients.
2. Medical patients used more CAM “manual healing” techniques
3. Medical patients perceived transient improvement with CAM than surgical patients.
4. Level of income is not a factor in whether chronic low back pain patients use CAM

Mesh terms: low back pain, income, complementary therapies



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HOW DO CULTURAL DIFFERENCES AFFECT SOCIAL FUNCTIONING IN MULTIPLE SCLEROSIS?

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Hypothesis: To determine if differences exist in perceived social functioning in patients with Multiple Sclerosis

Methods: A cross sectional study was carried out in which 48 patients (28 females and 20 males) from a University teaching multiple sclerosis clinic were interviewed using a survey consisting of the Physical Index of the McMaster Health Index Questionnaire (MHIQ-P), the Ethnic Diversity Survey (EDS), and the London Handicap Scale (LHS). Patients were stratified according to level of physical impairment using the MHIQ-P. Secondary outcomes included a comparison of marital rates and unemployment rates.

Results: It was found that just fewer than 50% of the multiple sclerosis population identified with non- North American cultures. T-test analysis showed that non- North American with severe physical impairment had a significantly higher mean mobility score than North Americans. Overall mean global LHS scores and scores in other social dimensions were not different between North Americans and non-North Americans.

Conclusions:

1. 54.2% identified as North American; 45.8% identified as other culture
2. Cultural identity had an impact on mobility and marital status
3. North Americans with severe disability more limitation mobility than Non –North Americans ($P < 0.05$)
4. North Americans more likely to be married than other cultures
5. The proportion of unemployment patients was over 83% in both groups.

More research would be needed to determine how culture impacts social function in patients with Multiple Sclerosis. Additionally, a more culturally sensitive approach to patient assessment should be incorporated by the Multiple Sclerosis team to determine the impact of culture on their diverse patient population.

Keywords: cross-sectional studies; cross-cultural comparison; multiple sclerosis; social medicine; disability evaluation



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IS SMOKING ASSOCIATED WITH AN INCREASED LIKELIHOOD OF DEVELOPING FOOT ULCERS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS?

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Objectives: To determine if there is an association between smoking and the development of ulcers in type 2 diabetes mellitus.

Methods: In a three-month case-control study, 26 type 2 diabetes were interviewed. They were divided into ulcer group (n = 17) and non-ulcer group (n = 9). A detailed smoking history was obtained. A comparison of smoking exposure (yes/no) between groups (ulcer vs. non-ulcer) was conducted. Kaplan-Meier survival curves were plotted for groups divided by smoking exposure. A comparison of the median pack-year history between ulcer and non-ulcer groups was completed. Statistical methods included Fisher's exact test, logrank analysis (of the Kaplan-Meier curves) and the Mann-Whitney test.

Results: Although 20% more in the ulcer group smoked (53% vs. 33%), the difference was not statistically significant (p = 0.296). Time from diagnosis to ulcer (survival) was not significantly different between smokers and non-smokers (p = 0.296). No significant difference between median number of pack-years smoked between the ulcer & non-ulcer group (p = 0.290).

Conclusions:

1. Type 2 diabetics with ulcers were not found to have different smoking history than those without ulcers.
2. Smokers were not determined to develop ulcers earlier than non-smokers.

Key words: diabetes mellitus, smoking, diabetic foot



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A RANDOMIZED DOUBLE-BLIND PLACEBO CONTROLLED TRIAL ASSESSING THE EFFECT OF THE ORAL CANNABINOID NABILONE ON PAIN AND QUALITY OF LIFE IN PATIENTS WITH FIBROMYALGIA

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Objective: To determine the benefit of nabilone in pain management and quality of life improvement in patients with fibromyalgia.

Design: Randomized, double-blind, placebo-controlled trial.

Setting: Outpatient musculoskeletal clinic.

Participants: 40 patients diagnosed with fibromyalgia.

Interventions: Nabilone was titrated up, from 0.5 mg PO at bedtime to 1 mg BID over 4 weeks.

Main Outcome Measures: The primary outcome measure, visual analogue scale (VAS) for pain, and the secondary outcome measures; number of tender points, the average tender point pain threshold, and the Fibromyalgia Impact Questionnaire (FIQ) were evaluated.

Results: There were no significant differences in population demographics at baseline. There was a significant decrease in the VAS (-2.04, $p < 0.02$), improvement in function on the FIQ (-12.07, $p < 0.02$), and decrease in anxiety (-1.67, $p < 0.02$), in the nabilone treated group at 4 weeks. There was no significant improvement in the outcome measures in the placebo group. The nabilone treated group experienced more side effects per person at 2 and 4 weeks of treatment (1.58, $p < 0.02$ and 1.54, $p < 0.05$) respectively.

Conclusions: Nabilone appears to be a beneficial, well tolerated, treatment option in patients with fibromyalgia, with significant benefits in pain relief and functional improvement.

Key Words: Fibromyalgia, Cannabinoid, Pain



RE06

REVIEW OF SPECIAL TESTS FOR KNEE MENISCAL INJURIES

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Many diagnostic special tests for knee meniscal injuries have been described in the literature. Three conventional and most quoted special tests of knee meniscal injuries are reviewed in this paper: 1) McMurray test, 2) Apley's test and 3) joint line tenderness. The technique of performing the McMurray test has been modified throughout the years. The original descriptions of the traditional tests are outlined and their evolution over the years is highlighted. The diagnostic effectiveness of these tests evaluated by different studies in the literature is discussed. There is a lot of variability in the sensitivity and specificity rates of these tests reported in the literature. No one test proves to be superior to the other in diagnostic accuracy. A combination of diagnostic tests with a good clinical history seems to be the most reliable method in detecting knee meniscal injuries. Two new meniscal injury diagnostic tests are introduced, namely the Ege's test and the Thessaly test.



SR02

**PROGNOSTIC INDICATORS IN METASTATIC SPINAL CORD COMPRESSION:
USING FUNCTIONAL INDEPENDENCE MEASURE AND TOKUHASHI SCALE TO
OPTIMIZE REHABILITATION PLANNING**

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Objective: To determine if patients with metastatic spinal cord compression (MSCC) make significant functional gains through rehabilitation. To study survival and predictors of survival in MSCC. To explore predictive factors for high or low functional gains in MSCC.

Setting: Inpatient neuro-oncology rehabilitation ward, Henderson General Hospital, Hamilton, Canada.

Methods: Clinical records were examined for 63 inpatients with MSCC. Demographics, treatment of MSCC, length of rehabilitation, admission and discharge Functional Independence Measure (FIM) scores, Tokuhashi score and survival data were collected. Statistical analyses included nonparametric comparisons, Kaplan-Meier analyses, Cox regression and exploratory logistic regression.

Results: FIM score improved from 83 to 102 ($p < 0.0001$). Estimated median survival from time of rehabilitation was 10.0 months. Kaplan-Meier analysis showed longer survival in patients with high Tokuhashi scores (9-15) compared to low scores (0-8) ($p < 0.005$); and high FIM change (> 13) compared to low FIM change (≤ 13) ($p < 0.02$). Cox regression revealed that high FIM gain and high Tokuhashi score were prognostic factors. Logistic regression showed Tokuhashi score (odds ratio [OR]=1.30, 95% confidence interval [CI]=1.04-1.62) and length of rehabilitation (OR=1.04, 95% CI=1.01-1.07) were associated with high FIM gain.

Conclusions: Functional outcomes in MSCC improved after rehabilitation. Patients who had a high Tokuhashi score and achieved high functional gains after rehabilitation had longer survival. Tokuhashi score and length of rehabilitation were associated with high FIM gain. The Tokuhashi score can help identify patients with good prognosis and potential for improvement during rehabilitation.



MSE01

ARE PROPHYLACTIC SUPPORTS OF THE ANKLE EFFECTIVE DUE TO THEIR ENHANCEMENT OF PROPRIOCEPTION AND SENSORIMOTOR CONTROL?

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Chronic ankle instability (CAI) is a significant cause of sports and recreation related morbidity. One of the primary mechanisms for reducing this risk is prophylactic support in the form of tape or bracing. This paper discusses research investigating the mechanism by which enhanced sensorimotor control (proprioception and the motor control it dictates) augments the mechanical support of ankle prophylaxis. Studies utilizing three basic approaches to understanding sensorimotor control of the ankle are discussed: kinesthesia, joint position sense and peroneal reflex latency. Many studies suggest that ankle supports enhance sensorimotor control, and this effect is enhanced in those with CAI. The proprioceptive benefit afforded by prophylactic support occurs through stimulation of cutaneous mechanoreceptors, which enhance afferent feedback from muscle mechanoreceptors to increase proprioception of the joint. Enhancement is maintained after months of wear due to a lower threshold of muscle mechanoreceptor excitation resulting from relative muscle inactivity. The findings suggest that prolonged prophylactic ankle support is efficacious throughout the treatment process to prevent re-injury.